Computer Science

DEVELOPMENT OF AN APPLICATION USED TO AID IN THE STUDY OF GRAPH THEORY

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Graph theory is a branch of mathematics that is important to computer scientists. It is useful in understanding algorithm analysis, intractability, and optimization, to name a few subjects. Few applications exist for the purpose of studying this field, however, and a developer wishing to create such an application must consider internal and external graph representation, graph serialization, user generated events, intuitive interface design, and usefulness. GraphTool is this researcher's product of such a development endeavor. GraphTool uses multiple device contexts and Bezier curves to produce a visually pleasing interface. GraphTool stores vertices and edges using derived C++ Standard Template Library classes. GraphTool's graphs are easily serialized and the resulting files are very small.

GraphTool's user interface is easy to understand and use. The testing of mouse clicks on graph edges is done in a time efficient manner using an in-memory device context. The application provides toolbars, menu items, and keyboard shortcuts, which allow the user to perform tasks in many different ways. GraphTool also provides an online help system in case the user has a problem using the application.

GraphTool can perform and animate some well known algorithms such as Dijkstra's algorithm and Prim's algorithm. These features combined with the user's ability to manipulate vertex positions, edge weights, and aesthetic properties (such as element color) make GraphTool a useful application for the study of graph theory.